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Virtual learning in ophthalmology training during the time of COVID-19: a perspective of clinicians' at a tertiary referral eye hospital, a cross-sectional study

COVID-19 sürecinde oftalmoloji eğitiminde sanal öğrenme: üçüncü basamak bir göz hastanesindeki klisyenlerin bakış açısı, kesitsel çalışma

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ABSTRACT

Aim: To evaluate the implementation of virtual learning in ophthalmology training during the time of COVID-19 through the perspective of clinicians.

Material and Method: A survey among physicians, who are actively involved in Ophthalmology-related training, was conducted. The expert survey comprised 29 questions and two parts addressing the application of virtual learning and the efficacy of webinars in increasing the clinical and surgical skills in Ophthalmology during the COVID-19 pandemic.

Results: A total of 42 Turkish ophthalmologists participated in the study. In the pre-pandemic period, lectures (92.9%), grand rounds with case studies (71.4%), and videos (61.9%) were among the first choices of the participants. A statistically significant increase in the use of e-learning modalities ($p < 0.001$ for all estimates) except for e-class with uploaded educational material was detected during the pandemic. Zoom® was recognized as the most used platform for virtual teaching. A statistically significant ($p=0.034$) decrease in time spent on surgical training was detected during the pandemic. 81% thought that webinars are good or very good in strengthening clinical skills within diagnosis and treatment. Also, 78.6% stated that webinars are good or very good in increasing surgical skills and management of complications. 64.3% supported webinars to be maintained even after the termination of the pandemic.

Conclusion: A considerable experience provided by virtual learning methods, especially webinars, may change conventional education practices and will also serve to build the foundation for teaching during future disasters and beyond.

Keywords: COVID-19, virtual learning, ophthalmologists, pandemic

ÖZ

Amaç: COVID-19 döneminde oftalmoloji eğitiminde sanal öğrenmenin uygulanmasını klinisyenlerin bakış açısıyla değerlendirmek.

Gereç ve Yöntem: Oftalmoloji ile ilgili eğitimlere aktif olarak katılan hekimler arasında anket yapılmıştır. Uzman görüşü anketi, COVID -19 pandemisi sırasında oftalmolojide klinik ve cerrahi becerileri artırmada sanal öğrenme uygulaması ile web seminerlerinin etkinliğini ele alan toplam yirmi dokuz soru ve iki bölümden oluşmaktaydı.

Bulgular: Çalışmaya toplam 42 göz hekimi katıldı. Pandemi öncesi dönemde, dersler (%92,9), olgu sunumlu toplantılar (%71,4) ve videolar (%61,9) katılımcıların ilk tercihleri arasındaydı. Pandemi sırasında yüklenen eğitim materyalleri ile e-sınıf dışında, e-öğrenme yöntemlerinin kullanımında (tüm tahminler için $p < 0,001$) istatistiksel olarak anlamlı bir artış tespit edildi. Zoom® sanal öğretim için en çok kullanılan platformdu. Pandemi sırasında cerrahi eğitim için harcanan sürede, istatistiksel olarak anlamlı ($p=0.034$) bir azalma tespit edildi. Katılımcıların %81'i, web seminerlerinin tanı ve tedavide klinik becerileri güçlendirmede, iyi veya çok iyi olduğunu düşünmekteydi. Katılımcıların %78,6'sı, web seminerlerinin cerrahi becerileri artırma ve komplikasyonların yönetimi konusunda, iyi veya çok iyi olduğunu belirtti. %64,3 katılımcı, web seminerlerinin pandeminin sona ermesinden sonra bile sürdürülmesini destekledi.

Sonuç: Sanal öğrenme yöntemleri, özellikle de web seminerleri ile edinilen önemli tecrübe, geleneksel eğitim uygulamalarını değiştirebilir. Sanal öğrenme, ayrıca gelecekteki olası felaketler sırasında ve hatta ötesinde, öğretim metodolojisinde yeni bir yapılanma oluşmasına hizmet edebilir.

Anahtar Kelimeler: COVID-19, sanal öğrenme, göz doktorları, pandemi

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has given rise to a global crisis in many sectors and severe changes in all aspects of our lives. A few months later the COVID-19 pandemic erupted; the vast majority of countries took drastic containment measures to control the rapid spread (1). As a consequence of that social distancing is an essential measure to limit the disease and decrease transmission, in many countries including Turkey, governments implemented lockdowns, curfews, and closures. In the following process, many areas such as the economy, lifestyle, industry, and healthcare dramatically changed in our deeply interdependent world. One of them was education as well (2, 3).

All outpatient activities were reduced, and elective surgical activities were suspended except urgent and emergency services indefinitely concerning the ophthalmology departments. As part of the combat against COVID-19, healthcare personnel including ophthalmologists were called to the front lines to cover COVID-19 wards such as inpatient floors and even intensive care units (ICUs). Scientific events, related to both theoretical and clinical practice, have either been canceled or deferred. Surgical and clinical training were impacted negatively (4, 5). Since providing high-quality training for residents and fellows remains vital and maintaining conventional in-person education in the course of restrictions is impossible; there has been a paradigm shift towards virtual learning strategies as the path to sustain academic continuity (4, 6).

Educators have utilized different virtual learning methods, especially webinars through various digital platforms such as Zoom, Microsoft Teams, Google Meet, Cisco WebEx, etc. to deliver lectures remotely. Trainees had the opportunity to attend by using laptops, smartphones, or tablets (7). It was important for participants to assess the efficacy and make a comparison between the previous traditional training system and newly implemented virtual learning strategies. To address these concerns, we aimed to assess the utilization of virtual learning and the efficacy of webinars in ophthalmology training from the perspective of clinicians at a tertiary referral eye hospital during the time of COVID-19.

MATERIAL AND METHOD

The study was carried out with the permission of Ankara City Hospital Clinical Research Ethics Committee (Date: 2021, Decision No: E1/1991/2021). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Informed consent details were obtained prior to the study commencement.

A cross-sectional survey-based study was conducted in April 2021 in the process of partially easing mandatory COVID-19 confinements including a curfew on weeknights and a full weekend. Moreover, a permit was also received for the study from the Directorate of Healthcare Services of the Ministry of Health. The survey of the study comprised a consent section declaring the aim of the study, the nature of the survey, study objectives, voluntary participation, declaration of confidentiality, and anonymity.

A total of 42 Turkish ophthalmologists including faculty, specialists, and residents participated in the study. Ophthalmologists who work at the aforementioned tertiary eye care referral center and who have participated in the virtual learning (webinar, etc.) program at least once or more during the pandemic period were included in the survey study. Those who have never participated in the pandemic process were excluded.

The survey was organized into two parts (see Supplementary Material X for the original survey). The first part (8) of the survey comprised 22 questions including the sections on demographics, educational status, teaching practice before the pandemic, teaching practice during the pandemic, and potential recommendations concerning the future implementation of virtual learning in ophthalmology. The types of questions involved single-choice (ten), multiple-choice "please select all that apply" (eight), five-point ordinal Likert Scales (three), and full-text answers (one). The second part (9) contained 7 single-choice questions that interrogate the efficacy of webinars in increasing the clinical and surgical skills of ophthalmologists during the time of obligatory social distancing of COVID-19.

The online survey (Google Forms) was conducted in the Turkish language and the link of the survey was shared via WhatsApp groups or individually to participants in the lists of contact persons belonging to the researchers. Respondents had the option of adding personal info such as names and email addresses, however, this was not obligatory. The survey could be answered only once, and it was available to participate in for 5 days.

Statistical Analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS) 22.0 program. Qualitative data were represented as numbers and percentages. Quantitative data were represented as means±standard deviation and median. McNemar test was used to compare "before" and "during" the pandemic periods for categorical data. The statistical significance level was considered as a $p<0.05$.

RESULTS

Of about 70 ophthalmologists who communicated, 43 responded to the survey. One of the participants was excluded from the study because of being on leave in the period before the pandemic, eventually yielding a response rate of 60%.

Demographics of the Participants

Overall, 14 out of 42 participants were males (33.3%) and 28 were females (66.7%). The mean (SD) age of participants was 34.3 (±9.04) years (range: 24–56 years). About 52.4% (n=22) were aged more than 30 years. Among the participants, 54.8% (n=23) were resident physicians, 33.3% (n=14) were ophthalmology specialists, and 11.9% (n=5) were faculty staff of ophthalmology. The rate of participants with more than 5 years of professional experience in the field was 47.6% (n=20). In **Table 1**, the participants' demographic profile is shown. 61.9% (n=26) of the participants had no primary area of expertise and were deemed as serving in comprehensive ophthalmology. The majority of participants with sub-specialties had expertise in the medical (21.4%, n=9) and surgical retina (19%, n=8) respectively, while other sub-specialties were also adequately expressed, as **Table 1** indicates.

Table 1. Demographic and special characteristics of survey participants (n=42).

Categories	Participants	n	%
Gender			
	Male	14	33.3%
	Female	28	66.7%
Age			
	<30	20	47.6%
	31–40	12	28.6%
	41–50	6	14.3%
	51–60	4	9.5%
Current academic status			
	Faculty	5	11.9%
	Specialist	14	33.3%
	Resident Physician	23	54.8%
Ophthalmology experience (years)			
	<5 years	22	52.4%
	5–10 years	5	11.9%
	11–15 years	8	19.0%
	>15 years	7	16.7%
Expertise			
	Medical retina	9	21.4%
	Surgical retina	8	19.0%
	Glaucoma	1	2.4%
	Cornea and refractive surgery	3	7.1%
	Cataract	7	16.7%
	Uveitis	1	2.4%
	Pediatric ophthalmology/Strabismus	3	7.1%
	Comprehensive ophthalmology	26	61.9%
	Neuro-ophthalmology	1	2.4%
	Low vision rehabilitation	1	2.4%

Virtual Learning Before and During the Pandemic

Our study revealed that the alternative methods employed for training in Ophthalmology varied during pre-pandemic and pandemic periods (**Figure 1**). In the pre-pandemic period, lectures (n= 39, 92.9%), grand rounds with case studies (n=30, 71.4%), and videos (n=26, 61.9%) were among the first choices of the participants for teaching residents and fellows, when web-based lessons with (n=4, 9.5%) or without (n=9, 21.4%) interactive participation, live streaming video conferences (n=9, 21.4%) access to virtual meetings from conferences (n=7, 16.7%), and e-class platforms (n=2, 4.8%) were uncommon. Whereas a statistically significant decrease in the preference for conventional teaching methods such as lectures and grand rounds with case studies ($p < 0.001$) in addition to an accompanying statistically significant increase in the use of e-learning modalities ($p < 0.001$ for all estimates) except for e-class with uploaded educational material were detected during the pandemic.

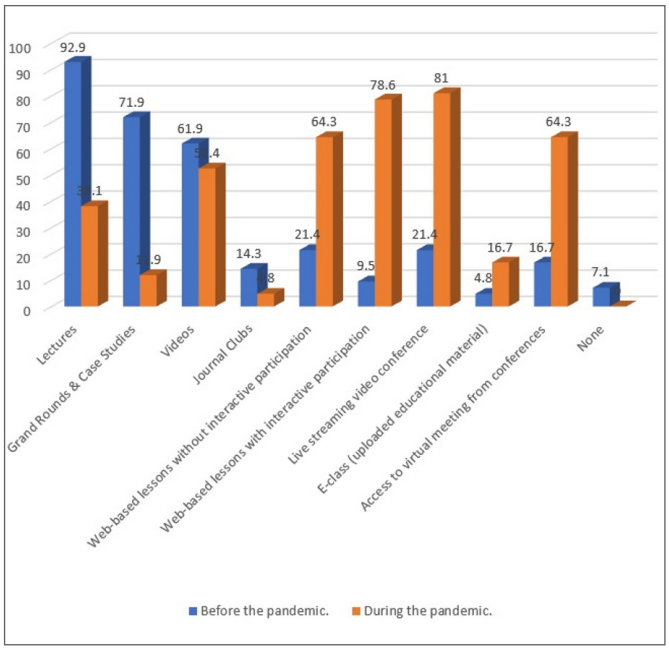

Figure 1. Teaching methods before and during the pandemic.

Specific platforms used for virtual learning are shown in **Figure 2**. Before the pandemic, Zoom® (Zoom Video Communications, San Jose, CA, USA, n=10, 23.8%) and Skype for Business® (Microsoft, Palo Alto, CA, USA, n=4, 9.5%) were among the main preferred platforms. During the pandemic, an increase in the use of Zoom® (n=42, 100%, $p < 0.001$) and Microsoft Teams® (n=16, 38.1%, $p < 0.001$) platforms was statistically significant, along with no difference in the use of other platforms before and during the pandemic. Participants indicated that neither facilities nor appropriate software and phone applications were provided by the institution for e-learning before the pandemic.

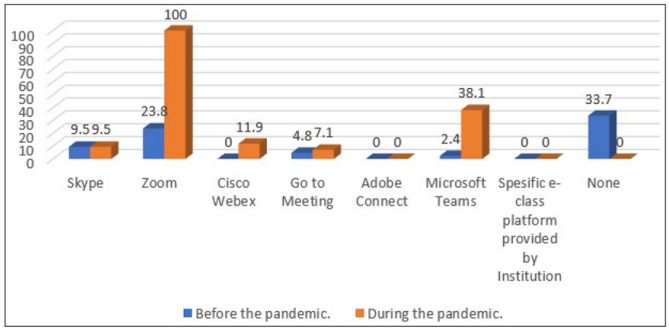

Figure 2. Specific platforms for e-learning before and during the pandemic.

There was no statistically significant difference in hours allocated for theory training between the pre-pandemic and pandemic periods. However, in terms of surgical training, a statistically significant (p=0.034) decrease in time spent was detected during the pandemic (**Figure 3**). The quality of teaching practice in the institution described as "good" on a five-point Likert scale was found to be statistically significant (p=0.014) decreased during the pandemic compared to before the pandemic (**Figure 4**).

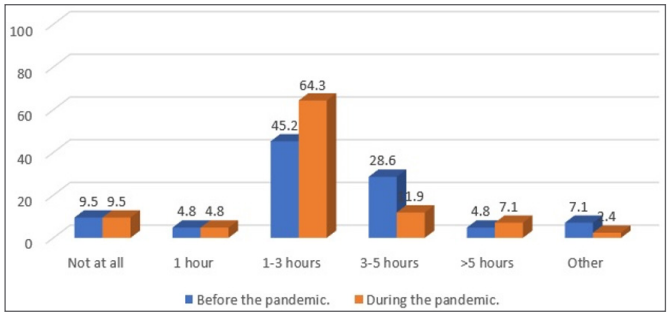

Figure 3A. Theory training weekly hours before and during the pandemic.

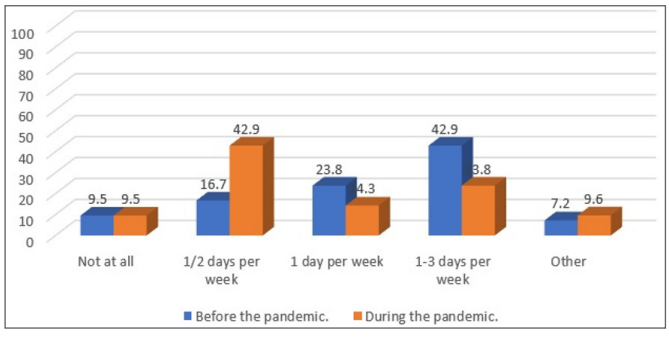

Figure 3B. Surgical training weekly hours before and during the pandemic.

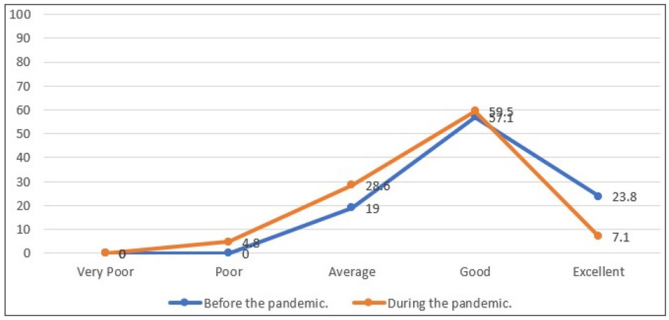

Figure 4. Current teaching practice description before and during the pandemic.

Efficacy of Webinars in Increasing the Clinical and Surgical Skills

81% of participants (n=34) were interested in the topic rather than the speaker or the company organizing the webinar. According to 40.5% of participants (n=17), the real regular conferences were better than the webinars. Still, 40.5% of participants (n=17) reported that they could keep their attention and concentration sometimes to the end. 81% of participants (n=34) thought that webinars are good or very good in strengthening clinical skills within diagnosis and treatment. Also, 78.6% (n=33) stated that webinars are good or very good in increasing surgical skills and management of complications. 47.6% (n=20) declared that an increased number of webinars affect their benefits and values negatively to some extent. Along with this, 64.3% (n=27) supported webinars to be maintained even after the termination of the pandemic (**Table 2**).

Table 2. Responses of the ophthalmologists related to efficacy of webinars in increasing the clinical and surgical skills during the time of COVID-19.

Questions	Options	n	%
Your interest in webinar is due to			
	The topic	34	81%
	The speaker	8	19%
	Institute/Company	-	-
In comparison, webinars to regular conferences, which is better?			
	Webinars are markedly better	2	4.8%
	Webinars are better	9	21.4%
	Webinars is the same as regular conferences	14	33.3%
	Webinars are worse than regular conferences	12	28.6%
	Webinars are markedly worse than regular conferences	5	11.9%
Your concentration and attention to webinar till its end:			
	Always to the end	2	4.8%
	Usually to the end	14	33.3%
	Sometimes to the end	17	40.5%
	Rarely to the end	5	11.9%
	Never to the end	4	9.5%
To which extent webinars increased your clinical skills indiagnosis and treatment?			
	Excellent	-	-
	Very good	3	7.1%
	Good	31	73.8%
	Bad	7	16.7%
	Very bad	1	2.4%
To which extent webinars increased your surgical skills and management of complications?			
	Excellent	-	-
	Very good	3	7.1%
	Good	30	71.4%
	Bad	7	16.7%
	Very bad	2	4.8%
Do you think increased number of webinars affect their benefits and values negatively?			
	Yes	5	11.9%
	No	17	40.5%
	To some extent	20	47.6%
Do you like to continue Webinars regularly after COVID-19 pandemic?			
	Yes	27	64.3%
	No	15	35.7%

Future Fulfillment of Virtual Learning in Ophthalmology

Our results revealed that 27 participants (64.3%) were "very" or "extremely" satisfied with practicing virtual learning in Ophthalmology as a teaching method. 23.8% of participants (n=10) think that virtual learning can replace "face-to-face" education. Noticeably, 88.1% (n=37) think that the experience of virtual learning modalities acquired during the time of pandemic will be utilized in future Ophthalmology training. Considerably, 26 participants (61.9%) felt that there were no barriers to the adoption of virtual learning for future training. 21.4% of participants (n=9) had no idea about potential barriers while the absence or restricted availability of e-learning facilities seemed the most significant barrier according to participants. Besides, ophthalmology is a surgical specialty that requires hands-on training. From this point of view, one of the biggest handicaps of virtual learning is that it does not offer an option for surgery at present.

DISCUSSION

The current study demonstrated a statistically significant increment in the adoption of virtual learning in ophthalmology training during the COVID-19 time. A considerable shift to distance learning from conventional methods was observed during the pandemic. Zoom was one of the most selected simultaneous distance learning platforms among the participants. Even though the time allocated for theoretical training seems to meet the requirements; a notable decline in the hours assigned for surgical training due to the cancellation of elective surgeries was found during the pandemic. This interruption of practical training in ophthalmology, a surgical specialty, prevents one from obtaining more exposure to the specialty and developing robust practical skills. Hence, causes concerns about surgical competency. Therefore, we hypothesized that when we leave the practical training perspective aside; virtual learning as an educational tool during the pandemic will go widespread gradually in the near future and become an indispensable auxiliary component of conventional education.

Virtual learning, defined as a method of learning designed for self-paced (asynchronous) or live web-conferencing (synchronous) in which the educator and trainees are physically separated and electronic technology along with the internet utilized in an online environment (10), has become more and more common among the learners in medicine (11). While virtual learning and e-learning (distance learning) are similar, there is one big difference virtual learning is an umbrella term for other terms and is more interactive (12). Flexibility in terms of place, time, or both; the convenience of access to big data; elimination of communication barriers such as the fear of talking to other participants that hinders participation; and cost-effectiveness are just a few of its advantages (13).

As the COVID-19 pandemic disrupted medical education and caused a suspension in traditional face-to-face learning activities, in-person academic activities have transformed into virtual learning globally. Similarly, in other eye clinics of the world (14, 15), rapid conversion to web-based education has taken place using specific platforms in our department of ophthalmology. In addition, elective operations were canceled and nonessential personnel in the operating room were minimized. Although innovative solutions through e-learning were offered for theory training; the dramatic drop in trainees' in-person exposure to patients negatively impacted surgical training. Even though surgical simulations are efficacious instruments for maintaining instructional requirements, they cannot replace real-life surgical situations. Moreover, the lack of wet labs or surgical simulators in our clinic has further deepened the crack in the quality of surgical training. That resulted in a statistically significant decrease in both times spent on surgical training and in the quality of teaching practice in the institution during the pandemic compared to before the pandemic in the current study. Our experiment confirms previous findings in the literature (15-17).

When the participants were asked about to which extent the online scientific webinars enhanced their clinical and surgical skills during the time of COVID-19; the majority commented that they were satisfied with the webinar's effectiveness in improving their knowledge and skills. This is in good agreement with previous findings (9, 18). 40.5% of participants found real regular conferences better than the webinars. This fits well with the results of Ebner et al. (19). Higher opportunities in face-to-face conferences for social networking and the reach of the audience could be counted among the reasons (20). Still, 40.5% of participants stated that they could focus their attention and keep concentration sometimes to the end. The characteristics of a webinar including the duration, frequency, and timing of the events or participants including gender, age, etc. could have a part in the effectiveness (21,22). Most of the participants supported webinars being maintained even after the termination of the pandemic. Some of the obvious advantages such as cost-effectiveness, convenience to attend, wider reachability, ubiquity, and geographical flexibility could play a major role in obtaining this result (9,18,19).

Several potential limitations relevant to the inherent nature of survey methodology need to be considered in the current study. First, the recall bias of the participants is incapable of being avoided as we asked them to state their

previous practices, and experiences, and remember their attitudes. However, responders consisted of participants with high education levels and socioeconomic status. Second, as it was purely online research, thus it can include uncertainty over the validity of the data and implementation issues. Another limitation was the relatively small sample size in the study.

CONCLUSION

The COVID-19 pandemic has rapidly evolved crisis globally and posed an unprecedented challenge to education. In this hard period, transformation in ophthalmology training, adaptation to virtual learning, and producing flexible approaches to maintain continuing professional development is inevitable. Virtual learning methods, especially webinars, have the potential to substitute face-to-face gatherings and open a new way to improve the knowledge of residents and fellows during these times of uncertainty. It is indefinite how long the COVID-19 pandemic lasts or whether there is another catastrophe awaiting humanity in the close future but beyond a doubt, virtual learning enables the dissemination of new advancements, provides educational convenience, and enhances academic experiences will become the future of ophthalmology training.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Ankara City Hospital Clinical Research Ethics Committee (Date: 2021, Decision No: E1/1991/2021).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Bedford J, Enria D, Giesecke J, et al. COVID-19: towards controlling of a pandemic. Lancet 2020; 395: 1015-8.
2. Li J-PO, Shantha J, Wong TY, et al. Preparedness among ophthalmologists: during and beyond the COVID-19 pandemic. Ophthalmology 2020; 127: 569-72.
3. Demirbilek Y, Pehlivanturk G, Ozguler ZO, Alp Mese E. COVID-19 outbreak control, example of ministry of health of Turkey. Turk J Med Sci. 2020; 50: 489-94.
4. Hussain R, Singh B, Shah N, Jain SJE. Impact of COVID-19 on ophthalmic specialist training in the United Kingdom—the trainees' perspective. Eye 2020: 1.
5. Gallo G, Trompetto M. The Effects of COVID-19 on Academic Activities and Surgical Education in Italy. J Invest Surg 2020; 33: 687-9.
6. Chick RC, Clifton GT, Peace KM, et al. Using technology to maintain the education of residents during the COVID-19 pandemic. J Surg. Educ 2020; 77: 729-32.
7. Kaup S, Jain R, Shivalli S, Pandey S, Kaup S. Sustaining academics during COVID-19 pandemic: The role of online teaching-learning. Indian J Ophthalmol 2020; 68: 1220-1.
8. Chatziralli I, Ventura CV, Touhami S, et al. Transforming ophthalmic education into virtual learning during COVID-19 pandemic: a global perspective. Eye 2020: 1-8.
9. Mossa EAM, Ali TM, Hammad A. On line Webinars During Time of COVID-19: Does it Increase the Clinical and Surgical Skills of Egyptian Ophthalmologists? J Clin Res Ophthalmol 2020; 7: 75-80.
10. Curran VR. Tele-education. J Telemed Telecare 2006; 12: 57-63.
11. Zollo SA, Kienzle MG, Henshaw Z, Crist LG, Wakefield DS. Tele-education in a telemedicine environment: implications for rural health care and academic medical centers. J Med Syst 1999; 23: 107-22.
12. Anohina A. Analysis of the terminology used in the field of virtual learning. J Educ Techno Soc 2005; 8: 91-102.
13. Arkorful V, Abaidoo N. The role of e-learning, advantages and disadvantages of its adoption in higher education. Int J Instr Technol Distance Learn 2015; 12: 29-42.
14. Wong TY, Bandello F. Academic ophthalmology during and after the COVID-19 pandemic. Ophthalmology 2020; 127: e51-e52.
15. Chatziralli I, Ventura CV, Touhami S, et al. Transforming ophthalmic education into virtual learning during COVID-19 pandemic: a global perspective. Eye 2021; 35: 1459-66.
16. Mishra D, Nair AG, Gandhi RA, et al. The impact of COVID-19 related lockdown on ophthalmology training programs in India–Outcomes of a survey. Indian J Ophthalmol 2020; 68: 999.
17. Silva N, Laiginhas R, Meireles A, Barbosa Breda J. Impact of the COVID-19 Pandemic on Ophthalmology Residency Training in Portugal. Acta Med Port 2020; 33: 640-8.
18. Gegenfurtner A, Ebner C. Webinars in higher education and professional training: a meta-analysis and systematic review of randomized controlled trials. Educ Res Rev 2019; 28: 100293.
19. Ebner C, Gegenfurtner A. Learning and satisfaction in webinar, online, and face-to-face instruction: a meta-analysis. presented at: Front. Educ 2019; 4: 92.
20. Hameed BZ, Tanidir Y, Naik N, et al. Will "hybrid" meetings replace face-to-face meetings post COVID-19 era? Perceptions and views from the urological community. Urology 2021.
21. Carrick FR, Abdulrahman M, Hankir A, et al. Randomized Controlled Study of a Remote Flipped Classroom Neuro-otology Curriculum. Front Neurol 2017; 8: 349.
22. Spalla TL. Building the ARC in nursing education: Cross-cultural experiential learning enabled by the technology of video or web conferencing: Unpublished doctoral dissertation, Ohio State University, Columbus, OH; 2012.